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ORIGINAL ARTICLES.

EDUCATION FOR OPHTHALMIC PRACTICE.*

ADDRESS OF THE PRESIDENT.

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DENVER.

WHEN forty years ago a few men met in New York to form the American Ophthalmological Society, the oldest of the American special societies, there were probably not two score physicians in America who "devoted themselves chiefly to the practice of diseases affecting the eye, ear, nose or throat." To-day there are more than two thousand within the borders of our country who are for that reason eligible to membership in this Academy, and who need a connection with such an organization. The specialist requires a special literature, he requires special societies, and primarily he requires a special education. So long as special training was needed by only a few scattered individuals, the means by which it might be obtained were of importance only to those individuals. But now that this special training is required by a large and rapidly increasing body of physicians, the institutions that furnish medical education must take upon themselves the task of meeting the demands of the time.

Among the most important problems regarding medical education that will demand early solution are those that cluster around specialization in practice. If, in the future,

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our profession is to be a group of closely associated specialists, the institutions which train men and women for its work must train them for special practice. As the most definite and most developed specialty that has grown up within the medical profession, ophthalmology probably shows in the clearest light yet obtainable, the needs and difficulties of such training, and on this account the discussion of education for ophthalmic practice has a broad general interest.

The advances in medical education during the past generation have all been in the direction of increasing its amount, either by lengthening the course of study, by raising the standard of requirements for admission to the medical schools, or by rendering the effort expended in medical instruction more effective by improved methods, such as laboratory demonstrations, and ward classes. But the accumulation of new facts, the opening up of new fields of scientific investigation, the increase of resources, applicable to the relief of human suffering, goes on with ever increasing rapidity. The new facts of value and importance in their medical applications, that each year brings to light within the broad domain of science, are beyond the power of any one human mind to master in a year's study. Specialization is then inevitable. Shall it be the specialization of disintegration or the specialization of organic development? Shall the medical profession be replaced by unrelated groups of narrow workers, ignorant of what is being done by the workers of other groups, having little contact with each other, and no broad scientific interest even in the problems which center around their own special work? Or shall we still have a great medical profession, its members capable of thinking beyond the daily routine, interested to trace relations in all fields of science, trained for full co-operation with all whose work it is to relieve suffering and conserve life? Which shall it be? The question must be answered by the medical education of the near future.

It was a misfortune that dentistry developed so much outside of the recognized lines of the medical profession. Perhaps it is our greatest debt to Helmholtz, and Graefe, and Donders, that ophthalmology grew up within those lines. In spite of the work of these great men and that of their

students, there are influences at work that tend toward the loosening of the bands which hold us in the medical profession. Most potent and dangerous among the influences are the failure of the medical school to give the specific technical training required for ophthalmic practice, and its failure to utilize certain branches of ophthalmology in the training of all medical students.

The training for a certain line of work must be judged first by the efficiency it confers for that particular work. Breadth of training, information and thought upon collateral lines are excellent, they are highly desirable, they are the things that I would argue for; but in preparing for a certain line of life work, the essential is training in that special work. Is there not something grotesque in the claim that the fitting of glasses should be done only by the medical profession, if the average graduate in medicine is sent out ignorant of the methods of measuring refraction, or with only the most superficial and perfunctory knowledge of the subject?

Remembering that a specialty exists because of what is special or peculiar to it, what is the special work constituting ophthalmic practice for which the practical ophthalmologist is to be trained? First, it deals with mathematical problems of refraction and ocular movements. Second, it includes particularly delicate and exact manipulations and operations. Third, it takes up the problems connected with a very special anatomy, physiology, pathology, therapeutics and hygiene. From these it extends so far as the individual practitioner may choose to go into the usual domain of general medicine and surgery.

It must be remembered that the correction of errors of refraction is something absolutely different from the usual measures of medical and surgical therapeutics. Success in this department depends not upon fortunate guessing, or the recollection of similar cases encountered in a wide experience; it depends upon a minute painstaking accuracy to furnish the data, from which a proper appreciation of physiologic relations can build the best formula for lenses. What has there been in the medical training of the past, what is there in the medical curriculum of to-day to train the student to

painstaking accuracy in mathematical measurements? Until he is so trained he is unfitted for the common, every-day work of ophthalmic practice. Not merely unfitted for dealing with rare conditions, the difficult cases, but unfitted to treat the first case that is likely to enter his office. Training in mathematics and mathematical measurements is the first step toward fitting the student for modern ophthalmic practice.

Next consider the need for education of hand and eye for the delicate manipulations properly expected of the ophthalmic surgeon. What is there in the usual medical course to cultivate the student's ability in this direction? True, he can spend time in a specially minute and delicate dissection. But how many medical schools require it? How much account will be taken of it in his final examinations? A medical course that merely permits the student to do this kind of work, is but one remove from a course that would permit him to gain all his medical knowledge and skill outside its requirements. There is nothing taught in medical colleges that cannot be studied outside. The plea that the medical course does not prevent the student from getting for himself the training required for ophthalmic practice, is practically an abandonment of ophthalmology to outside opportunities and outside instruction. But the present status of the medical course in this respect is not quite so innocent as this plea would make it. As a matter of fact the course is crowded with other things. The student's time and energy are so engaged by it that it renders other than its required training largely impossible. Then, too, the accurate eye and the delicate touch are things that must be acquired early in life. Year by year special excellence in these directions becomes less and less possible.

But perhaps the most glaring defect of the present medical course as a means of furnishing education for ophthalmic practice, is the lack of work in special anatomy and physiology. Anatomy and physiology are the foundations of scientific medicine. But the anatomy and physiology that have this relation to ophthalmic practice are the anatomy and physiology of the eye and related organs. It is of just as much importance for the ophthalmologist to have the train-

ing in this special anatomy and physiology early in his medical course, as it is for the general surgeon to be familiar with the anatomy of the bones and the joints before he takes up the study of fractures and dislocations. True, again, if the medical curriculum fails to occupy his whole time and so crowd the student that work outside of its lines will be impossible, he may take up this study of ocular anatomy and physiology as a sort of voluntary outside pursuit. But from those who attempt to determine his fitness for practice, he will not receive the same credit for knowing the depth of the anterior chamber where he is to make the cataract incision, as he would for remembering the location of the vermiform appendix or the anatomy of the ankle joint, for which knowledge he will in ophthalmic practice have no use whatever.

If you have followed my line of thought you have already noted that it gives a direct challenge to the old orthodox view of the training of a specialist, viz.: Teach the student how to cut off a leg, prescribe a compatible mixture, or manage successfully a case of labor—and leave him in ignorance of that vast accumulation of knowledge, and unskilled in those extremely delicate manipulations and precise methods, upon the accuracy of which his ability to serve the community as an ophthalmologist will chiefly depend. The plan of carrying a student through his college course in entire disregard of the line of work that he is to take up afterward, lacks any sound basis in psychology, and it is condemned by its results. Graefe entered upon the study of medicine that he might become an ophthalmic surgeon. All the knowledge and experience, all the manipulative and diagnostic skill that he gathered were arranged with reference to this purpose. From the first, each item took place and relations from its bearing upon ophthalmic practice. If I read his career aright, it was this fact far more than peculiar natural abilities and good opportunities, that made him the pre-eminent, practical ophthalmic surgeon among the founders of modern ophthalmology.

The hands, brain, intellect, of the individual develop but once; they reach the highest efficiency only when that development is continuous and intelligently directed from the start. All unrelated information is an incubus; every

accomplishment that brings no added ability by change of activity or broadened view, is a dissipation; and the spending of a large part of the four years of a medical course in loading up with useless detail of fact, and the acquiring of highly specialized ability to do what will never be done, is a criminal waste of vital energy when every bit of vital energy is needed. Either the medical course must be reorganized to give what the developing specialist needs, or the specialist will cease to take it. Let me protest that this is not a plea for a narrow specialism. It is the advocacy of a real specialism, so stripped of what is useless and hindering as to render possible the attainment of the broadest development of which the human mind is capable.

The work of readjusting the general scheme of medical education to the essential fact of specialism, must be one of revision, selection and rearrangement, not simply a matter of addition. The plan of raising the standard of medical education by adding now and again a year to the length of the course, has gone to the limit. We know how many years the average healthy individual can expect to spend in active life; we know how many years intelligence, nerve centers and muscles remain plastic, and best fitted to acquire new thoughts, co-ordinations and movements; we know at what age the best results in character demand that the young being should be thrown upon his own responsibility, left free to make his own choice and to self-support. These periods will not be greatly altered in a thousand years, however great the rush of discovery and the broadening of the field of human endeavor. The readjustment of the medical course cannot be a matter of infinite extension; it is a matter of wise selection.

From the standpoint of ophthalmic practice in the opening years of the twentieth century, what are the selections that will give the student, for the time and effort he expends, the highest efficiency in his chosen line of work? What will give this with the smallest amount of unprofitable acquirement, that he may be left with time, energy and intellectual appetite to follow to the furthest limit every line of thought that seems to him naturally related to his work? Yet which will give him the breadth of interest and sympathy, the all-

around mental development, which will fit him to see his work in its broadest relations?

In the end, a curriculum will be settled by experience, and is likely always to remain full of tradition and compromise. But it is worth while to guide ourselves, in these gropings toward something better, by the clearest statement we can frame of what seems at this time an ideal to be aimed at. Of the studies that now form the frame-work of the medical course, none can be wholly dispensed with. Possibly obstetrics in its narrower limitations might be cut out altogether; but certainly the outline of intra-uterine development, and some knowledge of the general conditions that mark pregnancy and the puerperal state, must be retained. The process of selection is not so simple as the selection of certain branches. It must go into every part of every branch of medical teaching, weigh the individual facts, and even choose the point of view and avenues for their approach.

In anatomy, the point of view has been too much that of the general surgeon. The specialist of internal medicine has suffered from this as much as the ophthalmologist. As the general surgeon would resent being required to learn and remember that minute anatomy of the retinal vessels which is needed for the understanding of a case of partial retinal embolism, so the ophthalmic surgeon has a right to protest against having his memory burdened with the land-marks by which the iliac artery might be located for ligature, or the position of the sciatic nerve determined for the injection of a local anæsthetic. If it is impractical to drill the general surgeon in all the minute anatomy that the ophthalmologist should know, it is equally impracticable to begin the preparation for ophthalmic practice by loading up with the anatomical equipment of a general surgeon.

The anatomy which the ophthalmic surgeon should know must include that of the eyeball and its appendages, the orbit and neighboring cavities, the visual tract and whatever intersects or comes in relation with it. These he must know with greatest accuracy and in minute detail. But to this knowledge must be added such a general acquaintance with the anatomy of other portions of the body as would enable him to understand the physiology and pathology of the

different organs and to appreciate any general principle of anatomical construction and support. Thus an acquaintance with the hip and shoulder joints will give a broader appreciation of the principles of the ball and socket movement which takes place in the case of the eyeball. While such things as the anatomical and surgical necks, the great trochanter, or the greater tuberosity of the humerus, have little more bearing on general anatomical principles than they have upon ophthalmic operations.

Physiology is so closely connected with general pathology —faults of nutrition in any part of the body are so often related to diseases in the eyes that its general principles should be as thoroughly taught to all who practice ophthalmology as to those who practice any branch of the healing art. Still there is much of detail, of surmise, of experiment not yet sufficiently connected with normal life processes, to make it possible to exclude a great deal that finds place in the physiological text-books, when it comes to selecting that which he can properly be expected to remember. The nervous, muscular and vascular systems are so extensively represented in the eye, and play such important parts in its normal and physiological life that nothing related to their general physiology should be neglected. Then there is the large mass of special physiology, such as ocular movements and the optical properties and actions of the eye, which must be mastered and assimilated before the education of the ophthalmologist can profitably go on to other branches. Shorn of all that can be dispensed with, physiology has for the ophthalmologist, as for the physician or general surgeon, an overshadowing importance.

General pathology—the physiology of disease—is of similar importance. Nearly all the general morbid processes are represented in the diseases of the eye. There is as much need for the familiarity with them here as in any branch of medical practice. Indeed so much more certain and definite is the pathology of the eye in some respects, as in renal retinitis, that more exact and definite knowledge of the changes he has to deal with, can properly be expected of the ophthalmologist than of the specialist of internal medicine, or of the general surgeon, who may be compelled to use his scalpel as an instrument of diagnosis.

The things that can be excluded from the training required in pathology will be chiefly the descriptions and examinations of special appearances presented in distant organs, and the special pathology of organs not closely related to the eye. As to the vast science of bacteriology, it is still uncertain to what extent such recently acquired knowledge can be rendered available for the instruction of the student. But that this subject touches ophthalmology as closely as any other branch of medicine, has already been proven; and a general acquaintance with it will certainly be more directly applicable to practice, and do more to broaden the student's intellectual horizon, than will instruction in many of the details which have in former years been given an important place in the medical curriculum.

The teaching of therapeutics offers some of the most difficult problems that are to be encountered in connection with the subject of medical education. On the one hand the physician has been swamped by the energy, cupidity, plausibility, and falsehoods of the promoter of new drugs. On the other hand, thereapeutics is preëminently the study for a life time. If there be general principles discernable in this branch of medical science, they are of highest importance to the ophthalmologist. If there be exact and comprehensive knowledge of the action of any drug upon tissues represented in the eye or its appendages, as all the general tissues are, that knowledge should be completely at his command. The therapeutic influences aside from drugs, at our disposal, demand equal attention. The eye has a situation peculiarly favorable for their efficient employment.

The special therapeutics of ophthalmology have grown to large proportions. This is illustrated by the recent interesting, but fragmentary, work of Darier. To gain time for what is most worth knowing in the first year of ophthalmic practice, something can be gained by cutting out from the course the materia medica and pharmacy, which were of value to a former generation. But when all has been done in a general way, it will still remain for the conscientious teacher of therapeutics to exclude a great deal that almost every other doctor might think his student ought to be taught. Nothing short of this will bring the subject into such com-

pass that the average student mind will be able to find it more than a mass of unrelated facts and contradictory assertions.

When we come to general medicine and surgery, as they have been understood and taught in the past, we come to the problem of teaching in cognate specialties. For these are little more than parent groups of yet imperfectly defined specialties, from which the more definite specialties, like dermatology and laryngology, are from time to time dropping off. The general principles which formerly justified the titles, "principles of medicine" and "principles of surgery," become more and more scattered to the general branches of physiology, pathology and therapeutics, although they might still be considered together in a philosophy of medicine. In every department of general medicine and surgery, and in every other specialty, there are facts and generalizations of the highest importanceto the ophthalmologist, both for their particular significance and the added breadth of view they will confer. The general symptomatology and course of syphilis and tuberculosis has a most direct and important bearing on the recognition and treatment of certain diseases of the eye. A knowledge of toxæmias of intestinal origin may have extremely important bearings on our treatment of toxic amblyopias. But not all the information and deductions that can be brought together under general medicine or surgery are of equal value. The mass is so great that some must be left out. Selection is the crying need in every branch.

No one can pass in review the numberless and vital connections of ophthalmic practice with other branches of medicine and surgery, without being impressed with the necessity for general medical education for this line of practice. The tendency to undertake it without any general knowledge of medicine shows serious defects in the present medical curriculum. It should be understood that the custom of teaching medical students a fair amount of internal medicine and general surgery, and the sending them out to adopt what line of practice they please, and qualify themselves for it as best they can, is doubly disastrous. The doctor of medicine who sets up as an ophthalmologist may be as ignorant of the actual work he is to do, as the counter-prescribing optician,

who also founds his hopes of success on self-sufficiency. The public, gaining some inkling of this, estimates the two as approximately equally valuable councilors, and goes to the cheapest. The medical student who subsequently takes up general or family practice, brought up in the same ophthalmic ignorance as his fellow student who has undertaken to practice ophthalmology, is quite liable to send his patients to the aforesaid prescribing optician, with whose particular brand of ignorance he is less conversant, and who is more likely to offer pecuniary favors in return.

The specialization of education, such as I have here urged, will do two things: it will furnish doctors of medicine really fitted for ophthalmic practice; and it will bind the medical profession together by bonds of mutual respect. It is not possible that special preparation for ophthalmic practice should remain dependent upon individual initiative. It is not desirable that it should be left to brief post-graduate courses, or to the so-called ophthalmic colleges. There is a great and pressing need that stable, conservative institutions of learning of the highest type should offer a formal course fitting their graduates for ophthalmic practice. When this is done it will be found to consist of certain special instruction added to a revised curriculum provided for all students of medicine. And medical education in general will have taken a long step forward.

DISCUSSION ON DRS. SUKER'S AND BUCKWALTER'S PAPER.

MELVILLE BLACK (Denver): Dr. Buckwalter's experience was so unique that it will be rather hard to find experiences parallel with it. It would seem to me, however, that this hæmorrhage would come under the nasal rather than a lacrimal hæmorrhage, inasmuch as the operation in the nose preceding the removal of the canula was responsible for the hæmorrhage. I have never had such an experience, but I have never tried to remove a lacrimal canula from the nose. I had one patient who had a lost lacrimal canula, and believing I could best serve her by extirpation of the lacrimal sac, I proceeded to do that, and removed the canula at the same time. This, in my opinion, is the best way to find these lost

canulas. I have had considerable experience with the use of canulas, and the more I have the more I dislike them.

As regards probing the lacrimal canal, I have always been favorable to the large probes. It has always seemed to me that if we are going to probe at all it is advisable to use a probe large enough to produce pressure. I cannot see any use in tickling the canal, and that is about all a small probe does. The longer I live, the more I think that probing does not effect a permanent cure, especially in cases that have reached the stage of purulent secretion. I used to think my cases got well, but I guess these cases went to some one else. The others came back later for more treatment, hence I am skeptical of these cases being cured by any form of treatment. In consequence, I lean more and more towards extirpation of the sac. It does away with the purulent secretion, the formation of pus, etc., and the patient is made comfortable and saved the trouble and pain of probing.

A. Alt (St. Louis): I agree with Dr. Black that this was a nasal bleeding and not a lacrimal bleeding. I thought of a similar case in my early ophthalmologic experience. The patient came to me with a lacrimal stricture. He told me that months before, while the doctor who treated him probed the canal, he had a sensation of something breaking, but he was told it was all right. I found considerable swelling in the lacrimal sac region, and on probing found the end of a silver probe that had remained in the lacrimal duct. I withdrew it with great difficuity, but no hæmorrhage followed.

With regard to the large probes, I am of the opinion of Dr. Suker. I have never had a probe put into my nasal duct, but I have put some very small ones into patients' ducts, and if they do not cause pressure I do not know what pressure is. I have never been able to understand the experience of Theobald, who, experimenting on dry skulls, came to the idea that such large probes would be useful. I never use them myself. I also agree with Dr. Black that the more I use them the less I think of the value of probing, and I gave up the slitting of the canaliculus many years ago. If I cannot get in with a small probe at first, I use the dilator. The largest I have used for years is No. 6, and when there is pus, I make simply injections. I do not know if we accomplish

much by this, but the patients want something done, and I suppose I will also have to practice the extirpation of the sac.

B. E. Fryer (Kansas City): I agree with Dr. Suker in regard to the large probes. If we remember the pathological conditions, we will see that we only add to the trouble by the use of the large probes. We have more or less cicatricial tissue, and the large probe and the sudden stretching will set up an increased amount of scar tissue in and about the canal. I agree with Dr. Alt and Dr. Suker in regard to not slitting the canaliculus, but disagree with them that slitting it necessarily interferes with the capillary power of the punctum. I do not do it any more, but if properly done this need not be brought about. Using the knife and cutting the lid towards the globe of the eye, we can still keep up the contact of the lid opening with the eyeball, thus retaining the capillary action in draining.

A. H. Andrews (Chicago): I had a case which came to me with a lost canula, and I was able to locate it underneath the inferior turbinal. A little pressure on the lower end pushed it up where I could get at it without much trouble. The canula was filled from one end to the other with granulation tissue. It had not been draining for a considerable time.

With regard to the use of probes, I am inclined to think that the value of any probe, whether large or small (and I am disposed to use the small rather than the large), will be greatly increased by the use of an electric current in connection with the probing. Either the positive or negative, as indicated, has decided therapeutic properties, and I am unable to see any reason why these therapeutic properties are not to be employed in the use of the probe in opening and making permanently open the lacrimal canal. The little experience which I have had has been much more satisfactory to me than the use of the probe has been to the gentlemen who have been discussing this paper.

Dudley S. Reynolds (Louisville, Ky.): There are cases in which the slitting of the canaliculus and the introduction of probes are necessary. No one, I presume, would undertake the cure of a purulent infection of the sac without dividing the lower canaliculus to secure free entrance of the syringe and exit for the accumulated pus below. In cases where

no infection exists, I have reached the conclusion, as a matter of personal experience, that probing is undesirable and in most cases injurious, and where probing is often repeated it gets to be of almost daily necessity. The patient finally growing tired of this daily procedure seeks other counsel, and he goes from one to another, and you will occasionally see a patient after ten years still unrelieved. We rarely find one entirely recovered through the probing. Where there is no purulent infection it will often be found that narrowing of the puncta causes the stillicidium. I have lost confidence in the theory of the mal-position of the punctum. I have known cases where dilatation of the punctum as the only local treatment, repeated two or three times, resulted in recovery. In many cases small doses of iodide of potassium would be sufficient to bring about a cure, but not in cases that have been subjected to the treatment by the probe, either large or small. Other cases are relieved by the injection, with a syringe, of a drop or two of the solution of adrenalin 1–1000. A large number can be fairly traceable to obstruction in the nasal passages, and the removal of the inferior turbinal bone does away with the difficulty. As to those cases in which it seems necessary to use the canula, some of them do well and some do not. I have had three or four cases, all in recent years, where I have seen impaction; one case where I had introduced the canula years before came suddenly to me with great pain in the side of the face, swelling in the region of the lacrimal sac, obstruction in the nose, and stillicidium. A search of the sac failed to disclose the presence of the canula, and a careful probing beneath the inferior turbinate bone found it tucked down tight. I seized it with forceps and made gentle traction and it came away in two pieces. It had become eroded and broken. In such a case, the introduction of a probe becomes necessary to insure the thorough washing of the passages, which I prefer to do with the normal salt solution, containing one grain of bichloride of mercury to the pint.

J. A. Donovan (Butte, Mont.): I believe most of these cases are reflex, probably due to conjunctivitis or some nasal trouble. A patient who was treated three months in Paris, consulted me on her return. I removed a small strip of the lower turbinate, after which she got well and remained so.

I disagree in the matter of probes. As was said, in most cases they are entirely unnecessary, but where necessary should be used. I can recall many cases treated previous to the last three years, and every one got well and remained so. I used them in one-fourth or more of my cases. I use the Theobald probe, and always pass the largest I am going to use the first time, using cocaine or general anæsthetic. I start with a low probe and use up to 12, 14 or 16 at first sitting. Where there is a history of having been treated by somebody for years, I use the probe until I feel a slight cracking in the bone. In about three days after this I pass a probe one or two sizes smaller, repeating a dozen to fifteen times when I consider the case well, and so far have had the good fortune to have them remain so.

Dr. Buckwalter (closing discussion): In the case of hæmorrhage, it does not seem to me the bleeding came from the nose, from the fact that on inspection the bleeding seemed to ooze from the region of the nasal duct, and pressure with adrenaline over the severed part of the turbinate did not control the hæmorrhage a particle. In this case I could not feel the end of the style by passing a probe into the lacrimal duct. By probing in the nose it was felt firmly fixed. I removed only the anterior part of the turbinate; the area exposed was not great. In treating epiphora, I agree with Dr. Reynolds that a great many cases are due to pressure stenosis, a congestion of the part of the lacrimal duct known as the naso-lacrimal duct. I have treated several ca-es in which probing had been carried on from a few weeks to a year or more, and I reported three cases in w'ch I operated on the inferior turbinate, removing a portion of it, and treating the inferior meatus. The idea is to relieve the congestion about the mouth of the tube. The lacrimal duct is a drainage duct, and it seems to me if you have inflammation of the sac, you have a stoppage of drainage, and you must re-establish drainage in order to keep up a constant flow of tears. By relieving the mouth of the sewer you relieve a great many of these cases.

Dr. Suker (closing discussion): I see that the consensus of opinion is about the same as I have expressed in regard to the use of large probes. Our effort should be directed

towards restoring, as nearly as possible, the normal condition in the canal. If you pass very large Theobald's or Bowman's probes you will not restore the natural condition. The canal is for drainage, and must not be robbed of its anatomical elements by undue probing. I have seen a number of cases where exceedingly large Theobald probes were passed, and they still complain of the trouble. The final treatment, and perhaps the only radical one at present, is the extirpation of the lacrimal sac, with the proper attention to any existing conjunctivitis.

SOME OBSERVATIONS ON THE PROGNOSIS AND TREATMENT OF HYPOPION ULCER OF THE CORNEA.*

By CHARLES J. KIPP, M.D.,

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IN a paper entitled "The Treatment of Serpiginous Ulcer of the Cornea," which I read at the meeting of the American Medical Association, Section of Ophthalmology, in 1902, and which is published in the *Journal of the American Medical Association*, August 2, 1902, I made the following statement:

"More than twenty years have now passed since I first observed that certain cases of serpiginous ulcer of the cornea, in which no further progress was noticed after they came into my hands, presented the features I am about to describe, and since then I have not seen a case in which they were present that did not heal under very simple treatment.

"From the margin of the ulcer straight or nearly straight lines, broadest at the ulcer and gradually tapering, diverge in all directions somewhat obliquely, through the parenchyma to the deepest layer. They never give off branches. The further end of these diverging lines are connected by grayish intermediate striæ, of the same width throughout, and running at right angles to them. If present all around, these intermediate linear opacities form a complete ring of the same form as the margin of the ulcer, but situated more

*Read at the meeting of the American Ophthalmological Society, July, 1904.

deeply, and 3 or 4 mm. distant from it. Sometimes a smaller ring is seen between the outer ring and the margin of the ulcer. The cornea between the opaque linear opacities here described is cloudy, but that outside of the outer ring is usually of normal transparency. An ulcer situated in the central part of the cornea with these striæ well developed, may be compared in appearance with a spider's web. In all of the cases of this kind seen by me the ulcer was at least five days old. I have never seen the picture develop in cases under treatment. The opaque lines gradually disappeared as the ulcer filled up. A few years ago, I made no microscopic examination of the exudation on the ulcer, but have done so recently, and while I have found the pneumococcus usually present in the progressive cases, I have been able to find but few in any of the cases presenting the above-described features. I think I am justified in assuming that the ulcer in these cases has ceased to be progressive and that any treatment which involves further destruction of tissue, or the danger of anterior synechiæ is entirely unnecessary and should be dispensed with. I feel so sure of this that even in the cases in which blennorrhea of the sac was present I have done nothing more in the way of surgical procedures than to split the canaliculus. In these cases the symptoms of the irido-cyclitis are usually not very severe, and the hypopion rarely fills more than the lower third of the anterior chamber. As I have already said, such cases always got well, and the only treatment required was warm fomentation with boric acid solution and instillations of a mydriatic. In all cases I was able to break up the posterior synechiæ by a 1 or 2 per cent. solution of sulphate of atropin, repeated often during the first day and less frequently after that. In most cases I have tried to expedite the complete cicatrization of the ulcer by gentle massage with a salve containing a small quantity of the yellow oxide of mercury.

"The opaque striæ here described and regarded by me as an evidence of the arrest of progress, were first described, as far as I know, by Saemisch in his famous chapter on the diseases of the cornea, and von Michel in his description of the serpiginous ulcer of the cornea corroborates what Saemisch has said about them. Both of these authors de-

scribe the linear opacities as of common occurrence in such ulcers, but neither of these writers look upon them as a sign that the ulcer has entered into the retrogressive stage. I have seen these linear opacities so often that it seems exceedingly strange to me that men of such large experience as Fuchs, Schirmer and Vossius have never seen the intermediary lines encircling the margin of the ulcer. I may mention here that I have been unable to find any reference to these linear opacities in the description of serpiginous ulcer in any American text-book. Whether or not the diverging opaque lines are due to folds in Descemet's membrane, as Schirmer seems to think, or are due to cell infiltration, as is held by Schmidt-Rimpler, I do not know; their similarity in appearance to the opaque lines diverging from the corneal wound sometimes seen after cataract extraction, can not be denied, but I have never seen in such cases the ends of the lines connected by the intermediary linear opacities. To me the diverging linear opacities have always seemed to extend obliquely to the inner layer of the cornea, although Schirmer says that they are all in the same place and in the deepest layer. I may say here, in passing, that I have seen precisely the same picture in cases of so-called abscess of the cornea, and in these cases also no further progress was noticed after the development of the linear opacities."

Since then I have seen many other cases presenting the features aboye described, and all of these too have healed without other treatment than the one above mentioned.

My object in referring to this matter once more, is to add to the above the result of a further study of the infected or hypopion ulcer of the cornea. During the last two years, I have observed that in the cases in which the straight diverging greyish lines radiate from *all* parts of the margin of the ulcer, if this was situated in the central part of the cornea, or from the margin nearest the center of the cornea, if the ulcer was situated near the periphery of the cornea, did as well under the simple treatment of warm fomentation of boric acid solution and instillations of a solution of atropin, as the ulcers in which the straight diverging linear opacities were connected by the greyish intermediate striæ, described in my first paper. In cases in which the greyish linear opac-

ities were seen only on a part of the margin of the ulcer at the time the case came under observation, I have usually resorted to this same simple treatment for a day or two, and have often seen the striæ develop from the parts of the margin which was free from them when first seen, and further progess was arrested. In other cases of the same class, the ulcer continued to progress, and the margin of the ulcer from which no greyish striæ radiated became somewhat raised and of a yellowish color, and from here the ulceration advanced. The bacteriological examination in many of these cases failed to reveal the presence of pneumococci or other bacteria in the scrapings from the ulcer. With regard to the involvment of the iris and the ciliary body, these cases did not differ from those described in the first paper. As to the treatment of the cases in which the linear opacities above described were absent, my views may be found in the paper published in the *Journal of the American Medical Association*, of August 2, 1902.

EXTRACTION OF ANTERIOR CAPSULE IN CATARACT OPERATIONS—MORPHIA HYPODERMICALLY IN SIMPLE EXTRACTION.*

By EUGENE SMITH, M.D.

DETROIT, MICH.

PRONE as we mostly are to the easy satisfaction on imperfect evidence and to rest in the experientia fallax, I desire only to lay before you the fruits of my own experience.

Regarding the extraction of the anterior capsule, let me refer to one or two of the anatomical features of the capsule. The anterior capsule is twice as thick as the posterior capsule. Most anatomists consider that the hyaloid membrane blends completely in front with the posterior capsule of the lens, which, in fact, represents it. There are other anatomists who think differently. If such were the case, i. e., if the hyaloid and posterior membranes were completely blended, would we be apt to extract the lens in its capsule without rupturing the hyaloid and getting an escape of vitreous? I think not.

*Read at the 9th meeting of The American Academy of Ophthalmology and Oto-Laryngology held at Denver, Aug. 24th to 26th, 1904.

Another fact: The anterior capsule is twice as thick at the anterior pole as at the equator. This point is evidenced by a bit of experience which has probably occurred to each of you, viz.: When we have wished to divide, with a needle, a secondary cataract that is somewhat thicker than usual, we have observed that the spot directly attacked with the needle did not tear, but a rent occurred in a portion of the capsule toward the periphery, and we failed to get a central opening.

The history of cataract operations and the very great diversity of practice in dealing with the capsule among different operators is abundant proof that the methods in common use are faulty in some respect. I wish to advocate the extraction of the anterior capsule as the best means of dealing with the capsule in any form of cataract extraction. It is not, perhaps, to be wondered at that more operators are not following this method, when we consider the amount of "cold water" thrown upon it by renowned teachers who hold up that "bête noire" dislocation of the lens, by pressure of the forceps in an attempt to seize the capsule. Dislocation is infinitely more apt to occur with the cystitome, and particularly if the capsule is thickened.

Knapp, some years since (1892), said: "There is a dark side to the secondary discission of the capsule—I mean the appearance of glaucoma." Others have noted the same, as well as the various forms of uveitis, etc.

It is a well known fact that seventy-five or more per cent. of the ordinary cystitome operations on the capsule require discissions later. Such is not the case where the capsule has been removed. In my experience less than three per cent. require subsequent discission; hence the fear of glaucoma and the other serious conditions occasionally following discission has been nearly removed from my practice.

I have not found a distinct opacity of the posterior capsule, except in cases where some degree of inflammatory reaction followed incomplete toilet. I have found rather a wrinkling, which I attribute to a lack of elasticity of the vitreous. The discission of this wrinkling I have ever found simple and seldom followed with inflammatory reaction.

Personal equation cuts but very little figure in the use of

the forceps. In 1891 (Sept. 6th number of the *Journal of the American Medical Association*) I published an article on "How to Deal with the Capsule," and gave to the profession a forceps which I had devised some time before, and which I have continued to use in all of my cataract operations since. In less than one per cent. of my cases have I failed to grasp and remove a large segment of the anterior capsule, and never have I dislocated a lens with the forceps. Many times I have removed the lens in its capsule, and never with loss of vitreous.

In a classic article by Landolt—"L'Opération de la Cataract de nos jours" (published in the *Archives Ophthalmologie* for 1892)—Landolt speaks favorably of my forceps and of having removed a lens in its thickened capsule without loss of vitreous. I have frequently, in cases of this character, gently loosened the lens from the suspensory ligament by a mild circular movement of the entire lens, after having grasped the capsule, before extraction.

I do not wish to convey the idea that I never have loss of vitreous in ordinary cases. I do, but no more so with the use of the forceps than in former years with the use of the cystitome. My particular reason for using the forceps has always been to escape the necessity for and danger of discission, and my experience in several hundreds of cases during the past thirteen or fourteen years has been all that one would wish for.

We have practically all experienced difficulties in the extraction of Morgagnian cataract where we have used the cystitome. A slight tear of the capsule permits the liquid cortex to escape, leaving the nucleus at the bottom of the wrinkled capsule, held as in a grasp; all endeavor to get it out increases the dangers. It has been my fortune to have had considerable experience in this class of cataract, and I had troubles of my own with the old cystitome and Greafe's knife, used to cut the capsule. Since, however, I have used the capsule forceps, I have never experienced any difficulty, the entire extraction being, usually, simple.

The forceps, as made for me by Luer, of Paris, contain four teeth on one blade and five on the other. The teeth are set on the under side of the drop, or curved portion of the blade, and only the points of the teeth made sharp. The

curve is located about 2 mm. from the ends of the blades, and is 1 mm. in extent. The curve is so gentle as not to interfere with the introduction of the forceps into the anterior chamber. The blades open automatically 5 mm. When the teeth are closed the blades are 1½ mm. apart, which prevents catching or bruising the iris. As the teeth drop into the pupillary space when introduced, there is no necessity for tilting the blades and thus pressing the flap.

Morphine hypodermically in cataract extraction.— In *Knapp's Archives* for 1894, page 85, is published an article written by myself on this subject. For some reason I feel that it has not met with the frequency of use it merits. As a myotic it is, in length of action, far superior to eserine, and the liability to prolapse of the iris is lessened by its use.

We are all aware of the fact that for hours after a cataract operation patients suffer pain or discomfort, and the tranquility so desirable is many times wanting on this account. Then, too, the discomfort may cause unconscious efforts to keep the eyes still, which may also produce prolapse by contraction of the recti or pressure of the orbicularis muscles. A cough, too, which is generally considered objectionable, is easily kept within bounds by the morphine.

Until a few weeks ago I have never known morphia, hypodermically, to cause vomiting. I think in this case it was due to individual idiosyncracy. I am pleased to state that the vomiting did not cause a prolapse, and the patient made a good recovery with a central pupil.

The sedative effect of the morphine and its strong myotic action fulfill very important desiderata in simple cataract extraction. I do not know whether the contraction of the pupil is due to the sedative action of the morphine upon the sympathetic nervous system, in consequence of which the capillary vessels of the iris become somewhat engorged and the pupil contracts strongly, or that a stimulation of the motor oculi centers causes the contraction. Suffice it to say, both a strong miosis and a sedative effect are produced. I give one-eighth of a grain immediately after the operation, and follow it once in three hours until four or five doses are given. Eserine is used, as usual, although I have, many times, depended entirely upon the morphine, not using the eserine at all.

CONCERNING THE SAFEST OPERATION FOR SENILE CATARACT.*

H. GIFFORD, M.D.

OMAHA, NEB.

WHEN the title of this paper was sent to the Secretary, I was experimenting with a form of cataract operation, which I fondly hoped would prove the safest yet. Subsequent experience has blighted this hope, but I have nevertheless thought it worth while to give the Academy the results of my experimentation, together with such conclusions regarding the safest operation for cataract as I have been able to draw from nineteen years of an average practice.

Some twelve years ago DeWecker proposed drawing the loosened conjunctiva over the cornea by a purse-string suture in most cases of large accidental wounds of the cornea, and the method had such obvious advantages in the case of aseptic wounds that after using it for several accidental wounds it occurred to me to try it in cataract extractions, when the danger of secondary infection was unusually great; or where there was almost a certainty of loss of vitreous unless some extraordinary method of closing the wound were adopted. The purse-string suture, however, had the disadvantage of preventing any inspection of the anterior chamber and iris, beside reducing to a minimum the action of atropine drops; hence when I first put the idea into practice, in 1901, I used what may be called a half purse-string suture; the conjunctiva being dissected back from the upper half or two-thirds of the limbus only; the stitch however, starting below the cornea and passing clear around it. When a stitch of this sort is tightened the conjunctiva is drawn over the upper third or half of the cornea leaving a space below for the inspection of the iris. The first patient on whom this was tried was a man with a luxated traumatic cataract with T + 2. The stitch was put into position, the ordinary incision made, and immediately after the extraction was completed the thread was tightened drawing the conjunctiva down over the upper ¼ of the cornea. There was practically no reaction and the

*Read at the 9th meeting of the American Academy of Ophthalmology and Oto-Laryngology held at Denver, August 24th to 26th, 1904.

final result was excellent. In this case I made the mistake of injecting a cocaine solution under the conjunctiva. This made the flap so stiff that it could be drawn past the edge of the wound only with difficulty. In subsequent operations of the kind I used adrenalin freely and anæsthetized by touching the conjunctiva with swabs moistened with 20% cocaine.

I used the same method on four other cases of dislocated cataract, one case having the additional complication of a purulent dacryocystitis, incurable in the time at the patient's disposal. The results so far as the prevention of loss of vitreous and infection was concerned, were perfect in all these cases, and the question then presenting itself was: If this procedure gives such good results in complicated cases why not be logical, and give all cases the extra protection which it affords? I could see no good argument against the proposition and proceeded to use a slight modification of the method in five ordinary or only slightly dislocated cataracts.* By doing so I hoped to accomplish three most important things: 1st, the prevention of secondary infection; 2nd, the prevention of loss of vitreous in case of rupture of the zonular ligament, either before or at the time of the operation; 3rd, a prevention of iris prolapse by the additional support which the tense conjunctival flap gives to the corneal flap, thus allowing one to dispense altogether with an iridec-

* The modification consisted in using instead of the half-purse string suture a single simple suture passed from a point just outside the middle of the loosened conjunctival flap through the fixed conjunctiva at the outer margin of the cornea. This stitch being inserted and drawn to one side before the incision is made, when tightened, draws the conjunctiva over the upper half of the cornea with much greater ease than any other stitch that I have tried. It produces a pucker which can be excised with a snip of the scissors. This gives a result approximately like that obtained by the method of Kuhnt, but is simpler.

I do not, however, give it my unqualified approval, because in one case in which I used it the eye was lost from purulent infection of the vitreous, the infection starting as nearly as I could tell at the stitch, and since this me hod brings the thread hole nearer to the angle of the wound than the purse string or half purse string suture it may be safer to use the former as has been recommended by Ellett, or a partial purse string which would leave only the lower third of the conjunctiva attached, and thus combine the advantage of allowing some view of the anterior chamber with an increased distance between the stitch and the angle of the corneal wound.

tomy, without the anxiety which has hitherto attended the simple operation.

The results in the first three cases were ideal. In spite of the fact that the new technique made the operation longer than usual, there was absolutely no reaction in the shape of pain or congestion of the iris and the visual results were above the average. The stitch caused absolutely no discomfort and came out or was taken out on about the sixth day, and the conjunctival flap gradually retracted to the edge of the cornea. In one of these eyes a preparatory iridectomy had already been performed, but in the other two a round pupil was left. Then followed in swift succession two infections. In the first there was a slight iris prolapse in spite of the tense conjunctival flap. To be sure the prolapse was entirely protected by the flap, and would of itself have caused no inconvenience nor danger, but with it there was a decided infection of the anterior chamber, with much pain, congestion and exudative iritis, subsiding under salicylate of sodium in the course of two weeks, and giving after a discission, vision $= {}^{20}/_{100}$.

The fifth patient was of an exceedingly tranquil disposition and although on the fourth day there seemed to me to be more congestion and discharge than was right, he complained of no pain, but on the next day it was evident that there was an infection. The stitch was removed, and the edges of the wound and the anterior vitreous were found to be purulent, and the case went on to partial necrosis of the cornea with mild panopthalmitis, and the eye was eviscerated. Thus having proved to my entire satisfaction that the large conjunctival flap is not a sure preventative either of secondary infection nor of iris-prolapse I decided that until some further perfections in the technique should make it safer I should reserve it for cases, in which, on account of a dislocated lens or some incurable infection, the dangers of the ordinary operation for cataract would be extraordinarily great. The fact that all of these large conjunctival flap operations including those of Kuhnt, C. H. Williams, Ellett and Czermak involve stitch holes through the membrane which we can never depend upon being aseptic may always prevent anything on this principle from coming into general use. In the operation of

Czermak it is true the stitch is placed at considerable distance from the wound, and might be dispensed with altogether, but it remains to be seen whether the difficulty of cleansing the sub-conjunctival pouch of soft lens matter and of dealing with iris prolapses, if they occur, will not limit the application of this operation also, to a comparatively narrow field. The operation of Czermak is, of course, a direct descendant of the operation of Desmarres as revived by Pansier, in which a large conjunctival flap is made, but not detached; but while this operation involves no stitching, the objections already urged against Czermak's operation may account for the cool reception which it apparently has received in its French home.

Dismissing, now for the present, the use of very large conjunctival flaps with one or more stitches as a routine measure, a brief discussion of the ordinary small conjunctival flap may not be out of place. It generally goes without question that if the operator believes in making his incision far enough out to permit such a flap to be made, it should be made as a safeguard againt secondary infection. Personally, I have always had a great deal of faith in the efficacy of these flaps, and at one time, but a few years ago, I made the flap much larger than is commonly done, not only at the summit, but at the angles of the wound. I was enabled to do this by making subconjunctival injections of cocaine, as has also been recommended by Koller, producing a bleb along the whole extent of the proposed wound, but I became convinced that this was a bad practice, the artificial œdema of the flap apparently interfering with its ready co-aptation at the close of the operation. I have accordingly returned to the use of the small conjunctival flap, but even this has some slight disadvantages, the chief of these being that even when turned forward as far as possible such a flap makes it less easy to do clean iridectomy; and where a prolapse of vitreous occurs, it is a distinct hindrance to the closure of the wound. These objections, however, do not seem to me serious enough to warrant giving it up.

As to the iridectomy, we can all agree that if it were not for the danger of iris prolapse, extraction without an iridectomy would be the rule. But while doing the simple operation I averaged about twenty per cent. of prolapses, pos-

sibly because, in order to get a conjunctival flap, I made too peripheral an incision. While, therefore, I envy the results of those who get only three to five per cent. of prolapses, I have ceased trying to emulate them, and make an iridectomy in all cases of senile cataract.

With those who take a similar view, the only question then is whether to make the iridectomy at the time of the extraction or as a preliminary operation. This has been threshed over a good many times, but the point is so important that until some consensus is arrived at I believe it should be reviewed occasionally. The chief objections to the preliminary iridectomy are, first, that it involves opening the eye twice; to this it may be said that a simple uncomplicated iridectomy is so nearly entirely safe that the increased risk involved by it is almost negligible. Second, that it involves greater loss of time, and, if the patient lives at a distance, an appreciably greater expense. This cannot be denied, but if on other grounds it is decided that the divided operation is safer, it seems to me that if the physician is in doubt as to whether the increase in safety more than counterbalances the increase in expense, the patient is the one to decide which is the one he prefers. In favor of the preliminary iridectomy is the unquestionable fact that the slighter the traumatism at any given operation, the less the danger of infection. With the iridectomy out of the way, the final extraction can be done if the capsulotomy is made with a knife, with the introduction of only one instrument into the eye, with a minimum of traumatism, bleeding, pain and loss of time.*

Another point in favor of the preliminary iridectomy, which in my opinion has not received sufficient attention, is

*One great advantage of the simple operation over the combined extraction as commonly done, is its painlessness. The pain experienced on seizing and cutting the iris, no matter how much cocaine has been dropped in the conjunctival sac, unnerves many patients, and some operators; but if two or three per cent. cocaine be injected under the conjunctiva so as to make a bleb around the lower half of the cornea, the iris can in most cases, after about five minutes, be seized and cut without causing any pain. I formerly made this injection around the upper half of the cornea, thus accomplishing the same purpose even more quickly, but as before mentioned have given this up on account of its tendency to interfere with rapid co-aptation, or adhesion of the conjunctival flap.

the lessened danger of small prolapses. This point has been urged especially by Aubineau, and is a very important one. These slight prolapses are so common, when the iridectomy is done at the time of the extraction, that Hirschberg, in a discussion of the subject, remarked that prolapse was as common with the combined operation as with the simple one. This statement, while it may be literally accurate, is not entirely candid, because most of these prolapses are so well concealed that they cause no disturbance; but it happens every now and then that a small prolapse at one end of the wound is a most troublesome thing and occasionally leads to sympathetic ophthalmia, more often, perhaps, than the larger prolapses, which occur with the simple operation. When the iridectomy is done, however, the angles of the coloboma become attached at the periphery of the anterior chamber, so that when the extraction is made the iris very seldom prolapses. In fact, I have never seen any difficulty from this cause after the divided operation. In view of these considerations I cannot help feeling that if I had a cataract myself, I should want it operated with a preliminary iridectomy, and doubtless many of you remember the occasion at a meeting of the British Ophthalmological Society, when the question was asked if there was any one present who would not prefer this operation for his own eye, and no one responded.

The custom seems to be with those who believe in the preliminary iridectomy to recommend this to patients who have but one eye, but not otherwise. I have never been able to see why we should not give a person with two eyes as good a chance for the first eye as for the second, and I consequently recommend the divided operation to all patients. Making it clear where the patient has two good eyes, and the question of time and expense is of great moment, that while I should prefer the divided operation if it were my own eye, the difference in the risk between the divided and the combined operation is not great, and allowing him to make the choice; but where the patient has only one good eye, I urge the divided operation without qualification.

In doing the divided operation, however, one must avoid the temptation to suit the patient's convenience and purse by

making the extraction too soon after the iridectomy. There can be no rule about the length of time which should elapse between the two operations. Occasionally an eye is as ready a week after the iridectomy as it ever will be, but in some cases it is better to wait two months, and it is always imperative, in order to decrease the risk to the minimum, to put off the extraction until every sign of increased discharge and irritability has entirely disappeared.

PAMPHLETS RECEIVED.

"Ophthalmic Memoranda," by G. E. de Schweinitz, M.D.

"On Intrascleral Nerve Loops," by Prof. Th. Axenfeld.

"Sequelæ of Ophthalmia Neonatorum," by D. M. Campbell, M.D.

"Liponea of the External Rectus Muscle," by C. A. Wood, M.D.

"The Technique of the Optical Iridectomy," by Prof. Th. Axenfeld.

"The Roentgen Ray in Ophthalmic Practice," by D. M. Campbell, M.D.

"Demonstration of Microscopical and Macroscopical Specimens," by Prof. Th. Axenfeld.

"Report of Two Cases of Family Macular Degeneration of the Cornea," by C. A. Veasey, M.D.

"The Conformation of the Face in Relation to the Development of the Eye," by F. T. Lewis, M.D.

"Report of the Eye Department in the Medical School of the University of Pennsylvania," by G.E. de Schweinitz, M.D.

"Brief Report of a Case of Spring Conjunctivitis Resembling Malignant Growth of the Corneal Limbus," by C. A. Veasey, M.D.

Report on a Case of Congenital Exophthalmos Produced by Orbital Hæmorrhage, Followed by Metastatic Choroiditis," by C. A. Veasey, M.D.

"Concerning Certain Cases of Asthenopia and Eye-strain which are Independent of Refractive Error and Muscular Unbalance," by G. E. de Schweinitz, M.D.

MEDICAL SOCIETIES.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.*

A. STANFORD MORTON, F.R.C.S., Vice-President, in the Chair.

Thursday, October 20th, 1904.

BLOOD SUPPLY OF THE OPTIC DISC.

Mr. NETTLESHIP communicated Notes on the Bloodvessels of the Optic Disc in certain mammals (18 species), and a few marsupials (3 species); no monkeys were included. The eyeballs were sent to him by Mr. F. E. Beddard, F.R.S., from the *post-mortem* room of the Zoological Gardens. The observations were based on the microscopical examination of both transverse and longitudinal sections of the optic disc, and the contiguous parts of the optic nerve. It was found in many mammals that the retina was almost entirely supplied by arteries derived from the choroidal system—cilio-retinal vessels—that reach the retina by passing round the sclero-choroidal border of the disc. Ophthalmospically this arrangement often (as, for instance, in the carnivora) caused an appearance somewhat like that of a deep glaumatous cupping, and such cupping had been stated by Lindsay Johnson to be present in these eyes. But no cupping was found in any of the eyes examined microscopically by the author of the present paper, nor was the assumption of cupping necessary in order to account for the appearance. Another interesting observation was that even when the cilio-retinal vessels carried virtually the whole retinal supply, the central artery was seldom, if ever, quite absent, though often reduced to a minute vessel entering the optic nerve close to the eye. In some species such a minute arteria centralis became much enlarged at the lamina cibrosa by tributaries from choroid or sclerotic, the short trunk thus formed breaking up almost immediately in the disc for distribution to the retina; and ophthalmoscopic examination of such an eye would naturally lead to the erroneous conclusion that the

*British Medical Journal.

supply was from a large arteria centralis as in man. Various other points were alluded to. The paper was illustrated by microscopical drawings.

Bacteriology of the Conjunctiva.

A paper on the Bacteriology of the Conjunctiva was read by Dr. W. B. Inglis Pollock, in which he reviewed and analyzed 204 cases of conjunctivitis in which a bacteriological examination had been made. There were 145 cases of acute muco-purulent conjunctivitis, including the acute contagious conjunctivitis of Weeks. Of these, 108 were due to the Week's bacillus, 7 to Morax's bacillus, 1 to pneumococcus, 2 to gonococcus, and 6 to staphyloccus pyogenes aureus. There were 3 of mixed infection, and 18 gave indefinite or negative results. In 20 cases of subacute conjunctivitis (Morax), the diplobacilli were found 14 times, Week's bacillus once, and there were 5 indefinite or negative results. In 9 cases of purulent conjunctivitis 4 were due to the gonococcus, 3 to Week's, one to pneumococcus, and one mixed with bacillus subtilis. In 10 cases of ophthalmia neonatorum, gonococci were found eight times, pneumococcus once, and once the result was negative. One case of membranous conjunctivitis was due to staphylococcus pyogenes aureus. Several other cases completed the series. The general symptomatology of the forms associated with individual organisms was discussed, and cases related bringing out special points. The advantage of a bacteriological examination of the conjunctiva prior to operation was illustrated by some cases. Cases of phlyctenular conjunctivitis only showed staphylococcus pyogenes aureus or the xerosis bacillus, and these, and especially the latter, were innocuous in the conjunctiva of almost all cases. They were consequently reduced to the theory of an endogenous origin, and Bruns had shown that by infecting sterilized tubercle bacilli into the arterial system he could obtain nodules very like phlyctenulæ. It was not possible yet to adopt a pure bacteriological classification of conjunctivitis, but such was coming nearer. For ascertaining the presence of gonococci a bacteriological examination was essential, and it should be carried out in all cases of membranous conjunctivitis. The paper was illustrated by lantern

slides which had been prepared for a course of lectures given by Dr. Freeland Fergus.

Demonstration.

Mr. Bishop Harman demonstrated a new ophthalmoscope; Mr. E. E. Maddox showed some pigmy needles for suturing cataract wounds, and some delicate electric connections for use after cataract extraction.

PAMPHLETS RECEIVED.

"The Mastoid Antrum," by S. Spencer, M.D.

"La Dacriacistorinostomia," etc., by A. Toti, M.D.

"Un Caso de Retinitis Circinada," etc., by M. U. Francosa, M.D.

"The Physiological Treatment of Cough," by F. C. Ewing, M.D.

"Memoir of Charles Henry Burnett, A.M., M.D.," by F. R. Packard, M.D.

"Report of Two Cases of Cerebral Abscess, with Recovery," by Ch. W. Richardson, M.D.

"Etiology and Pathology of Corneal Cysts, with Report of a Case," by E. L. Oatman, M.D.

"Asthenopia and a Few Facts that Ought to be Generally Known About it," by D. W. Stevenson, M.D.

"Simple Glaucoma in the Young, with a Report of Two Cases," by C. A. Veasey, M.D., and E. A. Shumway, M.D.

"A Case of Foreign Body Remaining in the Lens of the Eye for Six Years with the Lens Otherwise Clear," by F.W. Lewis, M.D.

"Two Cases of Paralysis of the External Recti Muscles of the Eyes, Tabetic in Origin, Improved by Operation," by F. N. Lewis, M.D.

"Report of a Case of Chronic Purulent Otitis Media, with Thrombosis of the Lateral Sinus; Radical Operation, Excision of Internal Jugular Vein; Recovery," by E. B. Dench, M D.